CAR Software Systems

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IT DOES NOT REPRESENT THE COMPANY / ORGANISATION / INSTITUTE THE PRESENTER BELONGS TO.

Education | Practical Approach

Course :

- **Software Engineering** (For BE / B.Tech Students)

Technology :

- **CAR Software Systems** (Google & Apple Developer's Playground)

Entrepreneurship :

- **Business Plan Development** (Business Model Canvas)
- **Product Management**
- **Market Research** (Trends & Predictions)

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Agenda

1. Introduction
2. Vision Statement
3. Requirement Analysis
    (a) Access Vehicle Properties
    (b) Detect Intrusion in Connected CARs
4. Solution Design | Algorithms | Design Patterns
5. Implementation & Testing
6. Result Analysis and Evaluation
7. Conclusion

Apple CarPlay vs Android Auto

https://www.stuff.tv/features/android-auto-vs-apple-carplay

Courtesy : https://apple.com & http://tub.tubgit.com/

Vision Statement

For the automotive service providers, who would like to make their customers' life simpler, CAR Software Systems provides solutions to diagnose car's health and notify when something goes wrong, that helps customers keep track of information about their CAR.

Unlike other diagnostic apps, our product communicates securely between cross platform vehicles, detects intrusion, monitors battery & fuel consumption and even remotely controls car.

Epic 1 : Access Vehicle Properties

Access Connected CARs using portable devices.

As a Product Manager, I would like to connect to CAR from my portable device, and detect all the possible device and sensor properties, so that user can know the status of cars.

Success Criteria:

- Verify that portable device can connect to car and authenticate successfully.
- Verify that portable device can detect and read all the available devices and sensors.
- Verify that portable device can change the device/sensor status remotely.
- Verify that systems can collect all the available data stored in cloud for analysis.
- Verify that system can analyse all the device properties and generate reports.

Epic 2 : Detect Intrusion in Connected CARs

Detect intrusion using Machine Learning Approach

As a Product Manager, I would like to detect and analyse intrusion, so that preventive measures can be taken in advance.

Success Criteria:

- Verify that system can scan and monitor connected cars.
- Verify that system can detect intrusion and alert the car owner / user.
- Verify that system can analyse detected anomalies from cloud.
- Verify that system can generate analysis report of the detected intrusions.
- Verify that system can recommend the possible recovery methods to user.

Accessing Connected CARs using Phone

1	CONNECT	Connect to the Vehicle from Mobile device and Authenticate.
2	DETECT	Detect Devices & Sensors (In-Vehicle | CAN | Connected Cars | Mobile IoT)
3	READ	Read the status of the Devices & Sensors
4	WRITE	Change the device | sensor status
5	DISPLAY	Display Device | Sensor's info on Dashboard
6	COLLECT	Collect and upload device details to Cloud for Analysis
7	ANALYSE	Device analysis using Machine Learning
8	CONTROL	Control vehicle using mobile (Lock, Unlock, Start, Stop | CAN Bus)

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Intrusion Detection in Connected CARs

1	SCAN	Scan the Devices | Sensors | WiFi in the Vehicle (On demand basis)
2	MONITOR	Monitor the vehicle system for accidental attack
3	DETECT	Detect Intrusion of attack from Network | Internet | Other IoT | Apps
4	ALERT	Alert the user about the issues / problems
5	COLLECT	Collect and upload Intrusion details to Cloud for Analysis
6	ANALYSE	Intrusion analysis using Machine Learning
7	REPORT	Generate the report (Detected Issues and other analysis information)
8	RECOMMEND	Recommendation | Recovery | Protection

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Testing : Simulators & Emulators

NOTE:

- For Research and Education, we use simulated environment like Simulators, Emulators and Developer's Playground to verify all the use cases.
- E.g. iOS Simulator, Android Emulator, CarPlay Simulator, IoT Simulators, Swift Playground, Google Playground and any other simulation platforms.
- We will not use any real device for testing functionalities.

How to enable iOS CarPlay Simulator ?

```
defaults write com.apple.iphonesimulator CarPlay -bool YES
```

https://www.apple.com/carplay

Courtesy : https://apple.com & http://tub.tubgit.com/

iOS - CarPlay - Available Models

ABARTH, ACURA, ASTON MARTIN, Audi, BENTLEY, BMW, Buick, Cadillac, CITROËN

CHERY, CHEVROLET, CHRYSLER, COWIN AUTO, DODGE, DS AUTOMOBILES, GENESIS, Ferrari

FIAT, Ford, GMC, Haima, HYUNDAI, Jeep, RENAULT, OPEL

KIA, LAMBORGHINI, MASERATI, Mercedes-Benz, MITSUBISHI MOTORS, NISSAN, MINI, PEUGEOT, PORSCHE

ROEWE, SEAT, ŠKODA, SUBARU, Confidence in Motion, SUZUKI, THE LINCOLN MOTOR COMPANY, VAUXHALL, VOLVO, MG

https://www.apple.com/in/ios/carplay/available-models/

Courtesy : https://apple.com & http://tub.tubgit.com/

Weekend Playground

Join using Google's class code : 8cupte

classroom.google.com (8cupte)

Courtesy : https://apple.com & http://tub.tubgit.com/

Mentor Profile

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Co-Founder: Wireless-School.org | Classes available only on Saturdays (8:00am - 4:00pm)

Passion: CAR Software Systems | Apple & Google Developer's Playground

Classroom: https://classroom.google.com | class code: 8cupte | qkw20s

Started: Since 2001 @ NITK - STEP, Surathkal, Srinivasnagar - 575 025, Mangaluru.

" Our vision is to make rural India smart "

Thank You